

## **REMARKS**

Claims 1-6, 8-23, 25-42, and 44-53 are pending in the application, with claims 1, 19, 22, 31-33, 39, 41, and 42 being currently amended, claims 7, 24, and 43 being newly cancelled, and claims 47-53 being newly added.

Independent claim 1 has been amended to more clearly define over the art of record. More specifically, claim 1 now specifies a wave absorber that has a resistivity of a high-resistance conductor layer that is larger than a resistivity of a conduct layer, and a surface resistivity of the high-resistance conductor layer that is in a range from  $100 \Omega/\square$  to  $100 \text{ k}\Omega/\square$ . Support for the amendments can be found throughout the application and at least at page 7, lines 19-21; page 46, lines 24-25; page 49, lines 12-13, and now cancelled original claim 7, for example.

Independent claims 33, 39, 41, and 42 are directed to either wave absorbers or wave absorber manufacturing methods and have been amended like claim 1. Support for the amendments to claims 33, 39, 41 and 42 can be found throughout the application and at least at page 7, lines 19-21; page 46, lines 24-25; and page 49, lines 12-13, and now cancelled original claim 43 for example.

Since each of the independent claims 33, 39, 41, and 42 are amended like claim 1, the remarks herein will focus on claim 1 (with specific mention of independent claims 33, 39, 41, and 42 where thought to be useful), but without waiver or right to present additional arguments, including as directed to one or more of the dependent claims should that become necessary.

Remaining independent claims 19, 22, and 31-32, like claim 1, are directed to either wave absorbers or wave absorber manufacturing methods and have been amended to more clearly define over the art of record by specifying that the resistivity of a designated layer is larger

than another designated layer and/or that a high-resistance conductor of the linear pattern resistance layer has a volume resistivity of  $1.0 \text{ E-}4 \text{ } \Omega\text{cm}$  or more and  $1.0 \text{ E-}1 \text{ } \Omega\text{cm}$  or less. Support for the amendments to claim 19 can be found throughout the application and at least at page 43, lines 10-13, for example. Support for the amendments to claim 22 can be found throughout the application and at least at page 13, lines 14-16 and page 52, lines 8-12. Support for the amendments to claims 31 and 32 can be found throughout the application and at least at page 43, lines 11-12, for example.

And finally, support for new dependent claims 47-53 can be found throughout the application, particularly the descriptions of the first to the ninth embodiments of the invention.

### **35 U.S.C. §103 rejections**

In the Official Action, each of the previously pending independent claims continue to stand rejected as being unpatentable either over Broderick U.S. Patent No. 5,576,710 ("Broderick") in view of Kasevich U.S. Patent No. 5,214,432 ("Kasevich") alone or further in combination with one or more of Dvorak U.S. Patent Application Publication No. 2004/0021597 ("Dvorak"), Sakurai U.S. Patent Application Publication No. 2003/0044623 ("Sakurai"), Okayama U.S. Patent Application Publication No. 2003/0107025 ("Okayama"), Kim U.S. Patent Application Publication No. 2004/0160486 ("Kim"), and Abe U.S. Patent No. 6,456,819 ("Abe"). Applicants respectfully disagree with the rejections, particularly in view of independent claims 1, 19, 22, 31-33, 39, 41, and 42 as now amended.

Broderick is the primary reference relied upon by Examiner in each of his rejections. In particular, Fig. 1 of Broderick has been replaced with Fig. 5 as the rejecting embodiment. To that end, with an initial focus on claim 1 of the present application (with specific mention of independent claims 19, 22, 31-33, 39, 41, and 42 where thought to be useful),

Applicants submit that even if Broderick is combined with the references of record referred to above, the pending claims of the present application are allowable thereover, as is explained next.

*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (To establish *prima facie* obviousness of a claimed invention, it is certainly well established that all the claim limitations must be taught or suggested by the prior art); See also MPEP §2143.03 (citing *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)) (All words in a claim must be considered when judging the patentability of that claim against the prior art or suggested by the prior art. (emphasis added)).

The wave absorber of independent claim 1 includes the following layers (i) to (v) and has been amended to include the characteristics (vi) and (vii), as set out below:

(i) A conductor layer which can reflect EM waves passed through following (ii) to (v) layers.

(ii) A first dielectric layer composed of a dielectric material in one layer or in multiple layers.

(iii) A resistance layer which can convert EM waves to heat.

(iv) A second dielectric layer composed of a dielectric material in one layer or in multiple layers.

(v) A pattern layer having multiple patterns composed of a conductor.

(vi) A resistivity of the high-resistance conductor layer is larger than a resistivity of the conduct layer.

(vii) A surface resistivity of the high-resistance conductor layer is in a range from 100  $\Omega/\square$  to 100 k $\Omega/\square$ .

The characteristics of (vi) and (vii) enables the wave absorber of the present invention to effectively absorb electromagnetic waves, which are in the target frequency range. When a surface resistivity of the high-resistance conductor layer included in the absorbent of the present invention is less than  $100 \Omega/\square$ , the following undesirable phenomenon occurs. In particular, as the surface resistivity of the high-resistance conductor layer becomes smaller, it becomes more difficult to effectively absorb electromagnetic waves included in the target frequency range because a function which reflects electromagnetic waves increases. And when a surface resistivity of the high-resistance conductor layer of the absorbent of the present invention exceeds  $100 \text{ k } \Omega/\square$ , the following undesirable phenomenon occurs. Specifically, as a surface resistivity of the high-resistance conductor layer becomes larger, it becomes more difficult to effectively absorb electromagnetic waves in the target frequency range, because a loss function, wherein electromagnetic waves are converted to heat, becomes large/high.

With specific reference now to Broderick, Examiner alleges in the Official Action that Broderick teaches a wave absorber having the following layers:

- (i) A conduct layer which is composed of an electric conductor and reflects EM waves (Fig. 5 of Broderick, item 76);
- (ii) A first dielectric layer composed of dielectric material in one layer or in multiple layers (Fig. 5 of Broderick, item 78);
- (iii) A high-resistance conductor layer having a surface resistivity within a prescribed range and converts EM waves to heat (Fig. 5 of Broderick, item 84); and
- (iv) A second dielectric layer composed of a dielectric material in one layer or in multiple layers (Fig. 5 of Broderick, item 84).

Examiner, however, recognizes that Broderick fails to disclose (v) a pattern layer wherein each pattern in the pattern layer differs in either or both of size and form relative to another adjacent pattern. In an effort to fill the teaching void of Broderick, Examiner resorts to Kasevich as well as Dvorak. Regardless, neither Broderick, Kasevich, nor Dvorak (or any of the additional references cited in the Official Action) alone or in combination disclose or suggest a wave absorber structure, which includes the (i) and (v) layers, as well as characteristics (vi) and (vii) now required by independent claim 1, as is discussed next.

In particular, although Examiner states that a conduct layer 76 reflects EM waves, Applicants submit that there is actually no disclosure or suggestion in Broderick that layer 76 reflects EM waves, which are passed through a layer 86, a layer 80, a layer 84 and a layer 78 of the structure 72 of Fig. 5. In addition, the characteristics (vi) and (vii), wherein a resistivity of the high-resistance conductor layer is larger than the resistivity of the conduct layer, and a surface resistivity of the high-resistance conductor layer is in a range from  $100\ \Omega/\square$  to  $100\ \text{k}\Omega/\square$ , are not at all disclosed or suggested in Broderick. In particular, the surface resistivity of layer 84 is not disclosed or suggested, and the relationship between the resistivity of the layer 84 and the resistivity of a layer 76 is not disclosed or suggested. And the additional art cited by Examiner fails to correct any of the aforementioned.

With reference specifically now to Pusch U.S. Patent No. 4,621,012 ("Pusch"), which is relied upon in combination with Broderick, Kasevich, and Dvorak to reject newly cancelled dependent claim 7 in the Official Action, Examiner states that Pusch discloses that the surface resistivity of a high resistance conductor layer is a range from  $100\ \Omega/\square$  to  $100\ \text{k}\Omega/\square$ . See col. 1, lines 38-47. However, upon review of Pusch, col. 1, lines 38-47 state the following:

U.S. Pat. No. 3,733,606 addresses the problem of detection by radar by using camouflage material consisting of a multi-layered material both absorbing and reflecting radar signals. At least one layer is a thin, non-homogeneous electrically conducting film having a surface resistivity at radio frequencies exceeding 2000 MHz of between 100 and 1000 ohms, but considerably different from 377 ohms, the characteristic impedance of free space, so as to establish reflection for at least 10% of the incident radar.

While it is accurate that col. 1, lines 38-47 of Pusch disclose a layer having a surface resistivity of between 100 to 1000  $\Omega$ , and the layer is included in a multi-layered material (camouflage material), there is no disclosure at all as to where that layer actually exists in the multi-layered material and what effect can be achieved by the layer. To that end, if Pusch were to be combined with Broderick by a person having ordinary skill in the art, Applicants submit that said person cannot know where such a layer exists in the multi-layered material. Therefore, the rejection of independent claim 1 (as well as independent claims 33, 39, 41, and 42) is improper and must be withdrawn.

And with specific reference now to remaining independent claims 19, 22, 31 and 32, these claims specify (viii) wherein a volume resistivity of a high-resistance conductor of a linear pattern resistance layer is 1.0 E-4  $\Omega\text{cm}$  or more and 1.0 E-1  $\Omega\text{cm}$  or less, and not (vii) wherein a surface resistivity of the high-resistance conductor layer is in a range from 100  $\Omega/\square$  to 100 k $\Omega/\square$ . In view thereof and with reference to Widagodo U.S. Patent Application Publication No. 2004/0094750 ("Widagodo"), which is relied upon in combination with Broderick, Kasevich, and Dvorak to reject newly cancelled dependent claim 24 in the Official Action, it is stated in the Official Action that Widagodo teaches a high-resistance conductor constituting a linear pattern resistance layer which has a volume resistivity that is 1.0 E-4  $\Omega\text{cm}$  or more and 1.0 E-1  $\Omega\text{cm}$  or less. See paragraph 24 of Widagodo. However, unlike the present invention, Widagodo discloses a granular composite, which contains a resin and filler, and thus simply fails to disclose a wave

absorber. In addition, the volume resistivity disclosed in Widagodo is "0.274 ohm-cm", which was obtained by measuring a mold material including a filler. Therefore, the rejection of independent claims 19, 22, 31 and 32, is improper and must be withdrawn.

Based on all of the above, Broderick further in combination with one or more of Kasevich, Dvorak, Sakurai, Okayama, Kim, Abe, as well as Pusch and Widagodo fails to provide all of the elements of Applicants' now claimed wave absorber or wave absorber manufacturing method. That is, a *prima facie* case of obviousness based on the cited art is not at all established insofar as the cited art, collectively, fails to disclose a wave absorber structure, which includes the (i) and (v) layers, and particularly the above discussed characteristics (vi) and (vii) or (viii), as is now required by the independent claims. Accordingly, the rejections of independent claims 1, 19, 22, 31-33, 39, 41, and 42 are overcome and must be withdrawn.

In addition, the remaining rejected dependent claims depend from one or more of corresponding independent claims 1, 19, 22, 31, 32, 33, 39, 41 and 42. Thus, Applicants submit that the Examiner's rejection of those claims is in error for at least the same reasons discussed above with respect to the independent claims. Furthermore, each of these dependent claims sets forth a unique combination of elements not disclosed or suggested by the combination of references.

For all of the above reasons, Applicants respectfully submit that independent claims 1, 19, 22, 31, 32, 33, 39, 41 and 42, along with their dependent claims, are allowable over the cited references.

### **Nonstatutory Obviousness-type Double Patenting Rejection**

In the Official Action, previously pending claims 1-46 stand provisionally and newly rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over various claims of copending Application No. 11874701 in view of Broderick and one or more other references as cited in the Official Action at Paragraphs 30-58.

Upon closer review, Applicants submit that the citation to copending Application No. 11874701 is incorrect. It appears that a typo has occurred. Instead, it is Applicants understanding that the copending Application No. should be 11574701, and not 11874701. Applicants acknowledge the provisional double patenting rejection to the later filed 11574701 application and will respond accordingly when the time comes. Applicants may be willing to file a terminal disclaimer in one of these cases should one become necessary. In the meantime, the Examiner is reminded of MPEP Section 804, subsection 1.B.1.

### **Conclusion**

As a result of the remarks given herein, Applicants submit that the rejection of the pending claims has been overcome. Therefore, Applicants respectfully submit that this case is in condition for allowance and request allowance of the pending claims.

If Examiner believes any detailed language of the claims requires further discussion, Examiner is respectfully asked to telephone the undersigned attorney so that the matter may be promptly resolved. Applicants also have submitted all fees believed to be necessary herewith. Should any additional fees or surcharges be deemed necessary, Examiner has authorization to charge fees or credit any overpayment to Deposit Account No. 23-3000.



Respectfully submitted,  
WOOD, HERRON & EVANS, L.L.P.

By /Randall S. Jackson, Jr./  
Randall S. Jackson, Jr.  
Reg. 48,248

2700 Carew Tower  
Cincinnati, Ohio 45202  
(513) 241-2324  
FAX (513) 241-6234